

Amendments to the Claims:

Listing of Claims:

1. (Canceled).
2. (Currently amended) The method of claim ~~1~~102 wherein each of said one or more surface pathways connect a source reservoir to a target reservoir.
3. (Currently amended) The method of claim ~~1~~102 comprising a plurality of said surface pathways, each of said pathways connect a source reservoir to a target reservoir.
4. (Currently amended) The method of claim ~~1~~102 wherein a plurality of said surface pathways form a network including a first plurality of said surface pathways each having a source reservoir and a target reservoir and a second plurality of said surface pathways each having a source reservoir and a target reservoir, said first plurality of surface pathways being interconnected to said second plurality of surface pathways.
5. (Currently amended) The method of claim ~~1~~102 further comprising a plurality of first said surface pathways connected perpendicularly to a second surface pathway, each of said first surface pathways and said second surface pathway having a source reservoir and a target reservoir.
6. (Currently amended) The method of claim ~~1~~102 wherein a plurality of said surface pathways are arranged radially from a source reservoir to a plurality of target reservoirs or radially from a plurality of source reservoirs to a target reservoir.
7. (Currently amended) The method of claim ~~1~~102 wherein said one or more surface pathways are rectilinear.
8. (Currently amended) The method of claim ~~1~~102 wherein said one or more surface pathways are curvilinear.
9. (Currently amended) The method of claim ~~1~~102 wherein said one or more surface pathways are sinuous.
10. (Currently amended) The method of claim ~~1~~102 wherein each of said heating elements are associated with a cell, said cell including at least one transistor, said transistor being activated for activating said heating element of said cell.

11. (Original) The method of claim 10 wherein said cells are arranged in a matrix array.

12. (Previously presented) The method of claim 10 wherein each of said one or more surface pathways connects a source reservoir to a target reservoir and one said heating elements is used for heating or cooling said source reservoir.

13. (Currently amended) The method of claim ~~1~~102 wherein said ~~patterned~~ surface is formed on a substrate and said heating elements are associated in registry with said substrate.

14. (Original) The method of claim 13 wherein a thermal insulation layer is coupled to an upper surface of said substrate and a bottom surface of said one or more heating elements.

15. (Original) The method of claim 13 wherein an electrical insulation layer is coupled to an upper surface of said substrate and a bottom surface of said one or more heating elements.

16. (Original) The method of claim 13 wherein an electrical insulation layer is coupled to an upper surface of said one or more heating elements.

17. (Original) The method of claim 13 further comprising a passivation layer coupled to said substrate.

18. (Original) The method of claim 13 further comprising a planarization layer coupled to said one or more heating elements.

19. (Original) The method of claim 13 wherein said one or more heating elements are coupled to a first region of said substrate and a heat sink is coupled to a second region of said substrate.

20. (Currently amended) The method of claim ~~1~~102 wherein said activated one or more heating elements form a thermal map.

21. (Original) The method of claim 20 wherein said liquid is a continuous stream and activation of said thermal map divides said stream into a series of droplets.

22. (Original) The method of claim 21 wherein said droplets have equal size or unequal size.

23. (Original) The method of claim 20 wherein said liquid is one or more droplets and activation of a first said thermal map traps said one or more droplets.

24. (Original) The method of claim 20 wherein application of a second thermal map releases said trapped one or more droplets.

25. (Original) The method of claim 20 wherein activation of said thermal map initiates a reaction.

26. (Original) The method of claim 20 wherein activation of said thermal map quenches a reaction.

27. (Currently amended) The method of claim ~~+~~102 wherein said ~~patterned-surface~~ chemical patterning comprises one or more hydrophobic portions confining a hydrophilic surface, said hydrophilic surface defining said one or more pathways wherein said liquid flows along said hydrophilic surface.

28. (Currently amended) The method of claim ~~+~~102 wherein a first said liquid is received in one of said surface pathways and a second said liquid is received in another of said surface pathways, said surface pathways being interconnected, wherein flow of said liquid in said surface pathways mixes said first said liquid and said second said liquid.

29. (Previously presented) The method of claim 28 wherein first said one or more heating elements apply a thermal gradient transverse to said surface pathways.

30. (Previously presented) The method of claim 28 wherein second said one or more heating elements apply a thermal gradient parallel to said surface pathways.

31. (Currently amended) The method of claim ~~+~~102 wherein an airborne material in gaseous, particulate or aerosol form is absorbed in said liquid and further comprising the step of: detecting said absorbed material.

32. (Original) The method of claim 31 wherein said material is detected by fluorescence of said liquid upon contact with said material.

33. (Currently amended) The method of claim ~~+~~102 further comprising the step of: storing said ~~patterned-surface~~ in glycerol.

34. (Currently amended) The method of claim ~~+~~102 further comprising the step of: applying a layer of glycerol on said ~~patterned-surface~~.

35. (Currently amended) The method of claim 27 further comprising the step of: applying a layer of glycerol on said hydrophilic surface.

36. (Canceled).

37. (Currently amended) The device of claim ~~36-107~~ wherein each of said one or more surface pathways connect a source reservoir to a target reservoir.

38. (Currently amended) The device of claim ~~36-107~~ further comprising a plurality of said surface pathways, each of said surface pathways connect a source reservoir to a target reservoir.

39. (Currently amended) The device of claim ~~36-107~~ wherein a plurality of said pathways form a network including a first plurality of said surface pathways each having a source reservoir and a target reservoir and a second plurality of said surface pathways each having a source reservoir and a target reservoir, said first plurality of said surface pathways being interconnected to said second plurality of said surface pathways.

40. (Currently amended) The device of claim ~~36-107~~ further comprising a plurality of first surface pathways connected perpendicularly to a second surface pathway, each of said first surface pathways and said second surface pathway having a source reservoir and a target reservoir.

41. (Currently amended) The device of claim ~~36-107~~ wherein a plurality of said surface pathways are arranged radially from a source reservoir to a plurality of target reservoirs or from a plurality of source reservoirs to a target reservoir.

42. (Currently amended) The device of claim ~~36-107~~ wherein said one or more surface pathways are rectilinear.

43. (Currently amended) The device of claim ~~36-107~~ wherein said one or more surface pathways are curvilinear.

44. (Currently amended) The device of claim ~~36-107~~ wherein said one or more surface pathways are sinuous.

45. (Currently amended) The device of claim ~~36-107~~ wherein each of said one or more heating elements are associated with a cell, said cell including at least one transistor, said transistor being activated for activating said heating element of said cell.

46. (Currently amended) The device of claim ~~36-107~~ wherein said cells are arranged in a matrix array.

47. (Currently amended) The device of claim ~~36-107~~ wherein each of said surface pathways connects a source reservoir to a target reservoir and one said heating element is used for heating or cooling said source reservoir.

48. (Currently amended) The device of claim ~~36-107~~ wherein said ~~patterned~~ surface is formed on a substrate and said one or more heating elements are associated in registry with said substrate.

49. (Original) The device of claim 48 wherein a thermal insulation layer is coupled to an upper surface of said substrate and a bottom surface of said heating elements.

50. (Original) The device of claim 48 wherein an electrical insulation layer is coupled to an upper surface of said substrate and a bottom surface of said heating elements.

51. (Original) The device of claim 48 wherein an electrical insulation layer is coupled to an upper surface of said heating elements.

52. (Original) The device of claim 48 further comprising a passivation layer coupled to said substrate.

53. (Original) The device of claim 48 further comprising a planarization layer coupled to said one or more heating elements.

54. (Original) The device of claim 48 wherein said one or more heating elements are coupled to a first region of said substrate and a heat sink is coupled to a second region of said substrate.

55. (Original) The device of claim 48 wherein said activated one or more heating elements form a thermal map.

56. (Original) The device of claim 55 wherein said liquid is a continuous stream and activation of said thermal map divides said stream into an array of droplets.

57. (Original) The device of claim 56 wherein said droplets have equal size or unequal size.

58. (Original) The device of claim 55 wherein said liquid is one or more droplets and activation of said thermal map traps said one or more droplets.

59. (Original) The device of claim 58 wherein application of a second thermal map releases said trapped one or more droplets.

60. (Original) The device of claim 55 wherein activation of said thermal map initiates a reaction at one or more of said heating elements.

61. (Original) The device of claim 55 wherein activation of said thermal map quenches a reaction at said one or more heating elements.

62. (Currently amended) The device of claim ~~36-107~~ wherein said ~~patterned surface~~ chemical patterning comprises one or more hydrophobic portions confining a hydrophilic surface, said hydrophilic surface defining said one or more pathways wherein said liquid flows along said hydrophilic surface.

63. (Currently amended) The device of claim ~~36-107~~ wherein a first said liquid is received in one of said surface pathways and a second said liquid is received in another of said surface pathways, said surface pathways being interconnected wherein flow of said liquid in said surface pathways mixes said first said liquid and said second said liquid.

64. (Previously presented) The device of claim 63 wherein first said one or more heating elements apply a thermal gradient transverse to said surface pathways.

65. (Previously presented) The device of claim 63 wherein second said one or more heating elements apply a thermal gradient parallel to said surface pathway.

66. (Currently amended) The device of claim ~~36-107~~ wherein an airborne material in gaseous, particulate or aerosol form is absorbed in said liquid and further comprising:
means for detecting said absorbed material.

67. (Original) The device of claim 66 wherein said material is detected by fluorescence of said liquid upon contact with said material.

68. (Currently amended) A method for routing a liquid comprising the steps of:
receiving said liquid on a patterned surface having an open architecture, said patterned surface comprises one or more hydrophobic portions confining a hydrophilic surface to form a pathway ~~having an open architecture~~; and

individually activating one or more heating elements,

wherein said heating elements are in registry with said patterned surface for selectively heating said patterned surface under conditions effective for routing said liquid along said hydrophilic surface and said one or more hydrophobic portions confines said liquid in said

~~hydrophilic surface flow of said liquid is by thermocapillary shear stresses and said liquid remains in constant contact with a gaseous phase.~~

69. (Currently amended) A device for routing a liquid comprising:

a patterned surface having an open architecture ~~receiving said liquid~~, said patterned surface comprising one or more hydrophobic portions confining a hydrophilic surface to form a pathway ~~having an open architecture~~;

one or more heating elements in registry with said patterned surface; and

means for individually activating one or more of said one or more heating elements, for selectively heating of said patterned surface under conditions effective for routing said liquid along said hydrophilic surface and flow of said liquid is by thermocapillary shear stresses ~~and said liquid remains in constant contact with a gaseous phase~~ said one or more hydrophobic portions confines said liquid in said hydrophilic surface.

70. (Currently amended) A method for dividing a stream of liquid comprising the steps of:

receiving said stream of liquid on a patterned surface having an open architecture, said patterned surface comprises one or more hydrophobic portions confining a hydrophilic surface to form a pathway; and

individually activating one or more heating elements,

wherein said heating elements are in registry with said patterned surface for selectively heating said patterned surface under conditions effective for dividing said stream of liquid into one or more droplets and said one or more hydrophobic portions confines said liquid in said hydrophilic surface.

71. (Currently amended) A device for dividing a stream of a liquid comprising:

a patterned surface adapted for receiving said stream of liquid, said patterned surface having an open architecture comprising one or more hydrophobic portions confining a hydrophilic surface to form a pathway;

one or more heating elements in registry with said patterned surface; and

means for individually activating one or more of said one or more heating elements, for selectively heating of said patterned surface under conditions effective for dividing said stream

of liquid into one or more droplets and said hydrophobic portions confines said liquid in said hydrophilic surface.

72. (Currently amended) A method for mixing two or more liquids comprising the steps of:

receiving said two or more ~~liquid,~~ liquids on a patterned surface, said patterned surface having an open architecture comprises, ~~comprises,~~ said patterned surface comprising one or more hydrophobic portions confining a hydrophilic surface to form a pathway, each of said liquids being received in one of said pathways, said pathways being interconnected; and

individually activating one or more heating elements,

wherein said heating elements are in registry with said patterned surface for selectively heating said patterned surface under conditions effective for mixing said two or more liquids in at least one of said pathways and said one or more hydrophobic portions confines said liquid in said hydrophilic surface.

73. (Currently amended) A device for mixing two or more liquids comprising:

a patterned surface, said patterned surface comprising one or more hydrophobic portions confining a hydrophilic surface to form a pathway, each of said liquids being received in one of said pathways, said pathways being interconnected;

one or more heating elements in registry with said patterned surface; and

means for individually activating one or more of said one or more heating elements, for selectively heating of said patterned surface under conditions effective for mixing said two or more liquids in at least one of said pathways and said one or more hydrophobic portions confines said liquid in said hydrophilic surface.

74. (Canceled).

75. (Currently amended) The method of claim ~~74-112~~ wherein said heat source is positioned in registry with one or more source said reservoirs.

76. (Currently amended) The method of claim ~~74-112~~ wherein said heat source comprises one or more heating elements.

77. (Currently amended) The method of claim ~~74-112~~ wherein said airborne material is detected by liquid by becoming fluorescent.

78. (Currently amended) The method of claim ~~74~~112 wherein said airborne material is applied by a convective stream of said airborne material perpendicular to said one or more pathways.

79. (Canceled).

80. (Currently amended) The device of claim ~~79~~113 wherein said heat source is positioned in registry with one or more source said reservoirs.

81. (Currently amended) The device of claim ~~79~~113 wherein said heat source comprises one or more heating elements.

82. (Currently amended) The device of claim ~~79~~113 wherein said airborne material is detected by liquid by becoming fluorescent.

83. (Currently amended) The device of claim ~~79~~113 wherein said airborne material is applied by a convective stream of said airborne material perpendicular to one or more said surface pathways.

84. (Canceled).

85. (Canceled).

86. (Canceled).

87. (Canceled).

88. (Canceled).

89. (Canceled).

90. (Canceled).

91. (Canceled).

92. (Canceled).

93. (Canceled).

94. (Canceled).

95. (Canceled).

96. (Canceled).

97. (Canceled).

98. (Canceled).

99. (Canceled).

100. (Canceled).

101. (Canceled).

102. (New) A method for routing a liquid comprising the steps of:
providing a surface having an open architecture, said surface including chemical patterning on one or more portions of said surface to form one or more surface pathways;
providing one or more heating elements in registry with said surface;
receiving said liquid on said surface; and
selectively activating said heating elements

wherein said chemical patterning confines said liquid in said one or more surface pathways and said activated heating elements by thermocapillary shear stresses provide selective movement of said liquid along said one or more surface pathways in a predetermined flow path.

103. (New) The method of claim 102 wherein said surface including chemical patterning has a flat topology.

104. (New) The method of claim 102 further comprising one or more ridges in said surface including chemical patterning and said one or more surface pathways being defined respectively along said one or more ridges.

105. (New) The method of claim 102 further comprising one or more indentations in said surface including chemical patterning, said one or more surface pathways being defined along said one or more indentations.

106. (New) The method of claim 102 further comprising one or more grooves in said surface including chemical patterning said one or more surface pathways being defined respectively along said more grooves.

107. (New) A device for routing a liquid comprising:
a surface having an open architecture, said surface including chemical patterning on one or more portions of said surface to form one or more surface pathways;
heating elements in registry with said surface; and
means for selectively activating said heating elements
wherein said chemical patterning confines said liquid in said one or more surface pathways and said activated heating elements provide selective movement of said liquid along

said one or more surface pathways by thermocapillary shear stresses in a predetermined flow path.

108. (New) The device of claim 107 wherein said surface including chemical patterning has a flat topology.

109. (New) The device of claim 107 further comprising one or more ridges in said surface including chemical patterning and said one or more surface pathways being defined respectively along said one or more ridges.

110. (New) The device of claim 107 further comprising one or more indentations in said surface including chemical patterning, said one or more surface pathways being defined along said one or more indentations.

111. (New) The device of claim 107 further comprising one or more grooves in said surface including chemical patterning said one or more surface pathways being defined respectively along said more grooves.

112. (New) A method for detecting an airborne material in gaseous, particulate or aerosol form comprising the steps of:

providing a substrate having an open architecture, said surface including chemical patterning on one or more portions of said surface to form one or more surface pathways;

selectively activating said heat source;

applying a liquid to said substrate and allowing said liquid to flow by thermocapillary shear stresses through activation of said heating source;

applying said airborne material to said substrate; and

detecting said airborne material in said liquid,

wherein said chemical patterning confines said liquid in said one or more surface pathways and said activated heat source provides selective movement of said liquid along said one or more surface pathways in a predetermined flow path.

113. (New) A device for detecting an airborne material in gaseous, particulate or aerosol form comprising:

a surface having an open architecture, said surface including chemical patterning on one or more portions of said surface to form one or more surface pathways;

applying a liquid to said substrate and allowing said liquid to flow by activation of said heating source;

selectively activating said heat source, wherein said chemical patterning confines said liquid in said one or more surface pathways and said activated heat source provides selective movement of said liquid along said one or more surface pathways by thermocapillary shear stresses in a predetermined flow path;

means for applying said airborne material to said network; and

means for detecting said airborne material in said liquid.

114. (New) A method for storing a device, said device comprising a device for detecting an airborne material in gaseous, particulate or aerosol form including a substrate having a network of one or more surface pathways on an upper surface of said substrate, said substrate having an open architecture, said substrate including chemical patterning on one or more portions of said surface to form one or more surface pathways, one or more heating elements in registry with said surface;

comprising the step of:

storing said device in glycerol.

115. (New) A method for storing a device, said device comprising a device for detecting an airborne material in gaseous, particulate or aerosol form including a substrate having a network of one or more surface pathways on an upper surface of said substrate, said substrate having an open architecture, said substrate including chemical patterning on one or more portions of said surface to form one or more surface pathways, one or more heating elements in registry with said surface;

comprising the steps of:

applying a layer of glycerol on said patterned surface.